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ABSTRACT

This study explores the question of accessibility to existing campus technology by low socio-economic, nontraditional, and minority college students. Questions posed are: (1) "Do nontraditional, low socio-economic and traditionally underrepresented students have the same access to computers and information technology as traditional majority students?"; (2) "Do nontraditional, low socio-economic and traditionally underrepresented students have the same computer training and information technology background as traditional majority students? " (3) "What factors are associated with access and frequent use of information technology?" and (4) "Do nontraditional, low socio-economic and traditionally underrepresented students have the same attitudes towards computer technology as traditional majority students?" A multiple-choice questionnaire was created to obtain information on: gender, race, ethnicity, and socio-economic background; computer access both on- and off-campus; students' current computer use and types of applications used regularly; computer skills and training; and students' computer perspectives. The study, planned to be administered to students at Arizona State University West in spring 1998, will help shape the future use of technology on the campus. (AEF)

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University Minority Students: Cruising the Superhighway or Standing at the On-Ramp?

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We entered the century with pencil and paper; we leave it with computers able to figure thousands of times faster than the human brain.
—Carol Sue Fromboluti

Universities can no longer remain aloof, ivy-covered towers of erudition and elite stature. Shrinking budgets, changing student demographics, and public demands for accountability have altered the traditional academic climate. Institutional response to the changing social and economic pressures has led to paradigm shifts, realignment of university missions, and instructional transformation. Among the instructional transformations embraced by many institutions is the incorporation of information technology as both a mode of instructional delivery and as a means for student learning and performance.

The prevalent movement towards increased use of information technology is not, however, primarily aimed at improving the quality of higher education. In reality, our institutions have found that they must turn to "information technology to stay in business" (Barone, 1996, p.28). Research suggests that instruction delivered through computer or distance learning is not only economically effective, but also instructionally effective (Castellan, 1993). To ignore or avoid technology at our institutions is to "drown under its weight" (Alvarez, 1996, p. 26)

Technology in Higher Education

In today's competitive market the use of electronic information resources is becoming a distinguishing attribute of institutions that pride themselves in offering the highest academic standards (Ringle, 1996). In fact, the presence of information technology is a critical asset in recruiting quality students and faculty, as well as in attracting external funding. Understandably, university students and their parents seek quality and low-cost education. At the same time, outstanding faculty are drawn to those institutions that provide them with the electronic tools for communication, information and research. In turn, it is the reputation of an institution's students and faculty that ultimately attracts external funds to support a university's growth and development.

Consequently, technology plays an increasing role in course design, delivery, and content. In 1995, between 20 to 30% of instructors in higher education used some form of instructional technology in course delivery (Goggin, Finkenberg, & Morrow, Jr., 1997). The number of college classes that use electronic mail rose from 8% in 1994 to 25.0% in 1996 (Green, 1996). By the same token, in 1996, about 9% of all college courses used WWW-based resources to support instruction (Green, 1996). In addition, according to Tapscott (1996), there are over 2,000 courses currently available on the Internet. Not surprisingly then, approximately 31% of all institutions of higher education have a computer competency graduation requirement and one in six institutions requires or strongly recommends that students purchase a computer (Cartwright, 1993).

Casualties on the Superhighway

While computers and the electronic superhighway are transforming higher education, university and college campuses are encountering a changing student population. Fewer than half of the nation's undergraduates are traditional 19 to 22 year olds (Cartwright, 1993) and minority student enrollment increased from 15% of all students in 1976 to 23% in 1993 (NCES, 1996c). These students bring with them a rich array of experiences and knowledge about the world. However, those experiences and knowledge may not have included the computer and multimedia technology.

Many students from culturally, racially and ethnically diverse backgrounds, as well as nontraditional students, come to higher education with fewer technology experiences and less computer expertise than their majority counterparts. As Krupar (1996) points out, a large

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proportion of these students is "technophobic" and lacks the necessary background and skills to fulfill computer-related assignments. These students find themselves unable to meet faculty and institutional performance expectations and to take full advantage of their university education.

National data bear out the differences in computer access and experiences among our students. As of June 1996, approximately 40% of all American households had computers, 21% of these had CD-ROM drives and 18% had modems (Famighetti, 1997). Thus, contrary to popular belief, most households do not have computers and fewer still have Internet and e-mail capability. Further, the number of computer-owning households is unequally distributed across race and ethnicity. Whereas 49.4% of White undergraduate students have computers at home, 27.0% of African American students and 27.3% of Hispanic students do (NCES, 1996a). Of those with home computers, only 36.4% of White students, 41.3% of the African American students, and 31.4% of the Hispanic students had a fax or modem (NCES, 1996a). Even more revealing is that 48.7% of the White population use computers at work, but 36.2% of the African Americans and 29.3% of Hispanics have that opportunity (NCES, 1996b).

This inequitable access to technology leads to information-poor segments of our society. Robert Bauchspies (1996) defines the information poor as those who exhibit one or more of the following characteristics:

- Illiterate
- Unable to determine their information needs
- Unable to discern value or relevance of information to their needs
- Unable to develop information seeking strategies
- Unable to afford access to information
- Unable to access information due to cultural or physical barriers

Bauchspies' definition highlights the urgent need to increase access to information technologies for those who either cannot afford the hardware and software costs for entering the Superhighway or who have been prevented from access through cultural inequities or physical barriers. Our institutions of higher education cannot ignore their obligation to prepare students who are literate professionals. In our increasingly technological society, literacy includes technological literacy.

The question of equitable access to technology and the superhighway becomes an ethical and academic issue. As Krupar (1996) states, more and more faculty require students to correct their spelling and grammar, use graphic presentations, and use several data bases in researching topics. Universities often function as if all traditional-age students are computer literate, can afford to purchase a computer and value computers (Krupar, 1996). However, low socio-economic families are less likely to purchase computers. Black and Hispanic households continue to have an average income that is approximately 60 % of that of white households (NCES, 1997). Unwittingly, institutional expectations for technological competence and computer ownership may lead to many causalities on the information superhighway.

Though there is much information about the inequities in computer access in grades K-12 (Coley, Cradler, & Engel, 1997), there seems to be very little information on this issue in higher education. One study that does explore this issue is an informal survey by Mendoza (1995) of students enrolled in a composition course. Mendoza found that the 25% of the minority students who owned a computer considered themselves middle class. Of the 75% who did not own a computer, almost half identified themselves as lower-income. However, the small sample size in this study limits generalizability.

Hypotheses and Instrumentation

To gain an increased understanding of access issues, three researchers began to explore the question of accessibility to existing campus technology by low socio-economic, nontraditional, and minority students. They posed the following questions:

- Do nontraditional, low socio-economic and traditionally underrepresented college students in higher education have the same access to computers and information technology as traditional majority students?
- Do nontraditional, low socio-economic and traditionally underrepresented college students in higher education have the same computer training and information technology background as traditional majority students?
- What factors are associated with access and frequent use of information technology?
- Do nontraditional, low socio-economic and traditionally underrepresented college students in higher education have the same attitudes towards computer technology as traditional majority students?

To answers these questions, one of the researchers created a multiple-choice questionnaire during the summer of 1997. During Fall 1997 the three researchers reviewed the instrument and revised it. In addition, the staff of our Information Technology office, the Associate Vice-Provost for Extended Instruction, and members of the Information Technology Advisory Committee reviewed the instrument and provided suggestions. The researchers incorporated their suggestions into the instrument.

The questionnaire currently has seventy-two multiple-choice items. Several items on this questionnaire also allow open-ended responses. Twelve items collect information on gender, race, ethnicity, and socio-economic background. Some of these items gather information on family background. For example, one item asks respondents how long their family has lived in the United States. Another item asks if the respondent is the first person in their immediate

family to attend college. Other items ask for direct information about the respondent. For instance, one item asks the respondents if English is their native language. Another item asks the primary source of financial support for their education. Yet a third item asks if they currently work full or part-time while attending school.

Nineteen items address computer access both on- and off-campus. Nine items focus on hardware access. For example, students are asked whether they use computers on campus and how frequently, whether they have a computer at home, the type of computer owned, and if they use a computer at work. There are also questions regarding on-campus multimedia facilities and their use. Four items examine computer software access. These items include questions on the types of programs used at the university computing center and at the campus library. An additional six items center on Internet and e-mail access. These items ask students if they have e-mail or Internet access at home, their frequency of use, and their purpose in using the Internet.

Twenty-three items on this instrument explore students' current computer use. Thirteen of these items ask for types of software applications used regularly, their frequency of use, and the purpose for using the software. Ten items examine classroom and course use of computers. For example, students will indicate whether their courses and program of study require computer use and whether their instructors use computers. In asking students if instructors use computers, the researchers hope to glean information about students' perceptions of faculty computer competency and faculty modeling of information technology use.

Another set of questions on the survey probes computer skills and training. To illustrate, students self-report their degree of computer knowledge, confidence, and number of courses about computers. Students will also indicate if they have taken courses over the Internet.

A final set of questions explores students' computer perspectives. Sample questions include whether respondents believe that all students at our institution have the same opportunities to use technology, whether computers are essential to their academic life and professional life, and whether scholarships should provide for computer purchase.

Sample

Arizona State University West is an upper division university with some 5,000 students enrolled in junior, senior or graduate level courses. Because ASU West does not offer freshman and sophomore classes, many of our students first attend one of the local community colleges. ASU West students enroll in Bachelor's and Master's degree programs in five academic areas: the College of Arts and Sciences, the School of Management, the College of Education, and the College of Human Services, as well as the Division of Collaborative Programs. Our students are largely female, 64%, and nontraditional, 65% are 25 years or older. Most, 63%, are also part-time students.

During the third week of the Spring 1998 term, a stratified random sample of 500 Arizona State University West undergraduate and graduate students will receive and respond to the survey. Since larger numbers of ethnic and racial minority students on our campus tend to enroll in specific degree programs, such as Bilingual Education, Global Business, Women's Studies and Social Work, stratification of the sample by program areas and ethnicity will ensure that a significant number of minorities on campus are included in the sample.

Procedure

Inasmuch as Arizona State University West is currently expanding the number of asynchronous course offerings, providing faculty development in Web page creation for distance learning, and preparing a university-wide five-year strategic plan, the researchers approached the administration with the idea of collaborating in a campus-wide survey. Consequently, the ASU West Office of Institutional Planning and Research is providing staff support and absorbing the cost of survey duplication.

During the third week of the Spring 1998 term, the researchers will administer the survey to students in selected classes from each of the five academic areas on campus. These classes, selected on the basis of enrollment, will include a racially and ethnically diverse student population. The Office of Institutional Planning and Research will then data process the responses and the three researchers will analyze the data.

Implications

Collaboration between university faculty and administrators can yield valuable information for institutional long-term planning, while adding to our knowledge base on technology and diversity. This study demonstrates how faculty scholarly endeavors can provide answers to essential administrative questions. The researches will widely disseminate the results of this survey across our campus. They will share the findings of this study with the Provost, the Vice Provosts, Information Technology, the Advisory Committee for Information Technology, the Campus Environment Team, the Office of Student Affairs, the Deans of each of our colleges, the Academic Senate, the Senate's Student Issues Committee and the Strategic Planning Committee. The results will help shape the future of technology use on our campus.

In addition, this study will serve as a basis for a national study on technology among diverse university populations. National data will offer a broader view of the current situation and help college and university educators discern the issues more clearly. The researchers believe the findings will provide information for administrators and faculty across the United States. The findings will help in planning for multimedia integration, distance learning, and

technology policies that will provide broad access to information technologies. Unless we know the problems, we cannot begin to address them. Furthermore, unless colleges and universities recognize the severity of the problem, they will unwittingly contribute to the academic failure of historically underrepresented college students (Krupar, 1996). Without adequate information, our institutions will perpetuate inappropriate computer pedagogy and obstructive administrative policies.

Ultimately, the ability of higher education to provide quality education for all students in a high-tech environment is a matter of planning for technological equity. Increasingly institutions of higher education allocate part of their limited financial assets to expanding and upgrading their multimedia technology resources. Clearly, technology will continue to play a critical role in higher education during the next century (Ward, 1994). As our institution cruise along the Superhighway, we need to make room for those who are standing at the on-ramp. To fail to do so is to abandon a growing portion of our student body to becoming the technologically illiterate.

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